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NATIONAL POLICY, GOALS AND OBJECTIVES AFTER CHEMICAL DISARMAMENT

BY

LIEUTENANT COLONEL ROBERT G. FAHL

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From this analysis, suggested changes to the U.S. national security objectives are proposed and recommendations relating to chemical weapons training, intelligence gathering and required advancements in research and development are provided.

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NATIONAL POLICY, GOALS AND OBJECTIVES AFTER
CHEMICAL DISARMAMENT

AN INDIVIDUAL STUDY PROJECT

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2 April 1990

ABSTRACT

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NATIONAL POLICY, GOALS AND OBJECTIVES AFTER CHEMICAL DISARMAMENT

CHAPTER I

INTRODUCTION

Since World War I, the United States has been in the forefront of peacekeeping nations in trying to ban the use of lethal poisonous gases in war. The Geneva Protocol of 1925, drafted by the U.S. delegation, outlawed the use of lethal chemical weapons. The United States and 28 other countries, including the Soviet Union, originally signed the Geneva Protocol pledging not to use chemical weapons except in retaliation for a chemical attack.¹ Although the U.S. Senate did not ratify the 1925 Geneva Protocol until 50 years later, the policy of "no-first-use" and "full and swift retaliation in kind to any enemy use of gas" were declared by President Roosevelt at the beginning of World War II, and this continues to be our policy today.²

Though there were minor uses of chemical warfare in World War II, none were used by or against the United States or its Allies. Further, while lethal chemical weapons were not used during the Korean War and the Vietnam conflict, there has been a significant proliferation of chemical warfare capability, espe-

cially in the Third World nations. Furthermore, there has recently been an accompanying escalation of use, with the latest event the alleged use of poison gas by the Soviet Union in April 1989 to quash a peaceful demonstration in Tbilisi in Soviet Georgia.³

The scope of this study is to reexamine current U.S. policy statements in light of ongoing chemical weapon reduction negotiations, to elaborate on the full spectrum of possible threats, to enumerate U.S. vulnerabilities in light of forgoing analysis, and then to make recommendations in the areas of national military policy, goals and objectives.

President Bush appears politically committed to accelerate and conclude a bilateral agreement on the prohibition and destruction of chemical weapons by the next summit meeting in June 1990. As senior military leaders, we must now determine what military strategies, goals and objectives must be developed to counter any expected threat during the negotiations/arms reduction period and after a complete disarmament. This paper will attempt to address these major issues.

BACKGROUND - U.S. CHEMICAL WEAPONS POLICY

To support its "deterrence" policy, the U.S. continued to manufacture chemical weapons until 1969. At that time, the U.S. unilaterally stopped production of chemical weapons, but not without having first acquiring a significant stockpile of chemi-

cal weapons, mostly mustard and nerve agents. Less than one half of the agents produced were filled in munitions. Additionally, while most of the munitions containing nerve agents are still usable today, only a small portion of the total stock of chemical weapons are suitable for employment on a modern battlefield.⁴ Realizing the importance in modernizing existing chemical weapon stocks, U.S. Army scientists began in 1954 the research and development of a new generation of chemical munitions--the binary chemical weapon. When President Nixon stopped all production of chemical weapons in 1969, research and development in the binary weapon program were allowed to continue, however, at a slower pace.⁵

In 1972, the Biological Weapons Convention was concluded, which prohibited development, production and possession of bacteriological (biological) and toxin weapons. As of 1980, 111 countries including the U.S. and the Soviet Union were signatories to the convention. Although the 1972 Biological Weapons Convention was a step in the right direction, it failed to include effective verification provisions. Today, it is estimated that at least ten countries--all signatories to the convention--have biological warfare programs.⁶

In 1975, perhaps as a direct result of the widespread publicity covering the alleged preparation of Egyptian, Syrian, and Jordanian forces for chemical combat during the 1973 Middle East War, the U.S. Senate finally saw it necessary to ratify the 1925 Geneva Protocol on chemical and bacteriological warfare.⁷

However, like most signatories, the U.S. signed with reservations that the Protocol did not apply to retaliation if chemical weapons were used first by the enemy.

Also in 1975, President Gerald R. Ford, in response to criticism on U.S. use of Agent Orange and non-lethal tear gas in Vietnam, issued an executive order still in effect today, which prohibits the first use of such non-lethal weapons in warfare.³

In 1980, following an interagency review of U.S. chemical warfare posture by the Defense Science Board, U.S. chemical warfare policy embraced for the first time arms control as a principal objective. Following this, the U.S. proposed efforts to eliminate the threat of chemical warfare by obtaining a complete, verifiable ban on the development, production, stockpiling and transfer of chemical weapons.⁹ The review also concluded that modernization of U.S. chemical stockpile was essential to a credible retaliatory capability. Modernization not only enhanced deterrence, but it also acted as a stimulus to arms control negotiations. In 1981, Congress appropriated funds for the construction of a binary production facility; however, it did not appropriate funds for production.¹⁰ Although the production of binary weapons is a contentious issue, a limited production program was authorized in 1986.

Since 1981 the U.S. has been an active participant in negotiations on chemical weapons at the 40-nation Conference on Disarmament (CD) in Geneva. In April 1984, Vice President Bush tabled a draft treaty seeking a verifiable mutual ban on the

development, acquisition, production, stockpiling, transfer and use of chemical weapons, and verifiable destruction of existing stockpiles.

At the United Nations in September 1989, President Bush proposed to the General Assembly a unilateral United States reduction of its chemical weapon stockpiles by 80 percent, if the Soviets reduced to an equivalent level. In a second phase, if all 40 nations of the Geneva Conference on Disarmament would sign a treaty banning chemical weapons, the U.S. would eliminate 98 percent of all its chemical stockpile. And finally, as soon as other nations possessing chemical weapons begun to destroy their stockpiles, the U.S. would move to eliminate the remainder of its assets.¹¹

Foreign Minister Eduard Shevardnadze, addressed the U.N. General Assembly 24 hours following President Bush, and accepted the U.S. challenge to cut back sharply on chemical weapons and called on the United States to even go further by eliminating all poison gas from U.S and Soviet arsenals. However, Deputy Foreign Minister Viktor Karpov, Moscow's senior civilian specialist on arms control, said in a news conference following Shevardnadze's speech that the Soviet Union, which claims to have stopped production of chemical weapons, would not destroy its stockpiles if the United States continued to manufacture new chemical weapons.¹²

In February 1990, in a meeting held at Moscow between Secretary of State James A. Baker III and Soviet Foreign Minister

Eduard Shevardnadze, both parties agreed to work towards a multilateral, effectively verifiable Chemical Weapons Convention banning the development, production and use of chemical weapons and eliminating all stocks globally. While multilateral negotiations proceed, both sides agreed to work out a bilateral agreement on the destruction of the bulk of their chemical weapon stocks to equal low levels (approximately 20 percent of U.S. stocks) and exchange technological data. During the first eight years after the Chemical Weapons Convention comes into force, the U.S. and the Soviets would further reduce their chemical weapon stocks to equal levels, approximately two percent of U.S. current holdings, and other countries would do likewise. Then, provided all chemical weapons capable countries adhere to the Convention, all remaining stocks would be eliminated within a final two years. Besides a ten year time line for the global destruction of all chemical weapon stocks, the multilateral Convention would also contain the provision that all production of chemical weapons would halt upon its entry into force.¹³ This prohibition of chemical weapons production after a multilateral Convention appears to have satisfied Karpov's concern that the U.S. would attempt to continue to modernize its chemical weapon stockpile.

ENDNOTES

1. Chemical Warfare Review Commission, Report of the Chemical Warfare Review Commission, p. 12.
2. Ibid., p. 16.
3. Frank Gaffney Jr., "Bush Ignored Chemical Weapon Experts," Defense News, 23 October 1989, p. 23.
4. Chemical Warfare Review Commission, p. xiii.
5. Ibid., pp. 16-17.
6. Thomas J. Welch, "The Growing Global Menace of Chemical & Biological Warfare," Defense 89, p. 20.
7. Hugh Stringer, Detering Chemical Warfare: U.S. Policy Options for the 1990s, pp. 1-2.
8. Chemical Warfare Review Commission, p. 17.
9. Stringer, p. 27.
10. Chemical Warfare Review Commission, p. 18.
11. Stephen Green, "Chemical Charades," Christian Science Monitor, 23 October 1989, p. 19.
12. Don Oberdorfer, "Soviet Calls for End Of Chemical Arms," Washington Post, 27 September 1989, p. A1.
13. Reuter, "Test of U.S.-Soviet Communique on Elimination of Chemical Weapons," Washington Post, 11 February 1990, p. A6.

CHAPTER II

THE CHEMICAL WARFARE THREAT

PROLIFERATION

Despite the horrors of chemical warfare during World War I (over 1.3 million gas casualties) and the prohibition of chemical weapon use endorsed by the 126 nations who ratified the 1925 Geneva Protocol, chemical weapons have become readily available not just to the major powers, but also to third-world countries.¹ In 1984, when then-Vice President Bush proposed at the Conference on Disarmament a treaty seeking a verifiable ban on the production and stockpiling of chemical weapons, it was estimated less than ten countries possessed chemical weapons. Today, over 20 nations have chemical weapons or the means to produce them (see figure 1).²

The proliferation of chemical weapons is not unexpected. Chemical weapons are cheap and easy to build, a low-tech operation. They are produced principally from chemicals and technology with legitimate industrial applications, and can be produced by any country that manufactures pharmaceuticals, pesticides, or fertilizers. The dual use of materials and facilities make production of chemical weapons relatively easy to produce, but very difficult to detect. Further, chemical weapons are capable

COUNTRIES CONFIRMED OR SUSPECTED POSSESSION
OF CHEMICAL WEAPONS³

POSITIVE OR STRONG PROBABILITY

SUSPECTED

France	Taiwan	Somalia
United States	Vietnam	Cuba
Soviet Union	Burma	Chile
Israel	Iran	Pakistan
Egypt	Iraq	Thailand
Ethiopia	Syria	Republic of Korea
China	Afghanistan	South Africa
North Korea	Libya	
Belgium		

Figure 1

of causing mass casualties. They offer less-developed countries a way to balance their military capabilities against a larger, or modern and sophisticated force. In essence, chemical weapons are considered the Third World countries "poor man's atomic bomb."⁴ In addition, many Third World countries are acquiring long-range delivery systems, such as ballistic missiles, suitable for chemical warheads. The U.S. Arms Control and Disarmament Agency estimates that by the year 2000 at least 15

developing countries will be producing their own ballistic missiles. This adds yet another dimension to the dangerous chemical weapon proliferation problem.

THE SOVIET CW THREAT

The USSR has the most extensive chemical warfare capability in the world. In 1985, the U.S. Department of Defense acknowledged that the Soviet's chemical warfare preparedness far outranked that of any other nation state.

The USSR is better prepared to conduct operations in a chemical environment than any other force in the world. Soldiers receive extensive chemical defense training. Most combat vehicles are equipped with a chemical protection system and a chemical detection alarm system. Chemical defense troops with specialized detection and decontamination equipment are found throughout the ground forces... Their continued testing of chemical weapons, the enlarged storage capacity of chemical agents and weapons, and the existence of active production facilities are indicators of a serious weapons program.⁵

The Soviets have fourteen known chemical weapon production facilities, and can produce a wide variety of toxic agents to include persistent and non-persistent nerve agents, blister agents, blood agents and toxins. Although the Soviets continue to deny they possess an offensive biological warfare program, the Sverdlovsk biological agent accident of 1979 that resulted in the release of anthrax from a bacteriological warfare institute, provide positive evidence of their capability.⁶ Further, strong evidence indicates the Soviets can deploy chemical warheads on

sixteen different modern weapons, including aircraft bombs, howitzer rounds, mortar rounds, land mines, grenades, multiple rocket launchers, free rockets over ground (FROG), tactical ballistic missiles, and possibly cruise missiles.⁷ In addition, there is evidence that the Soviets are developing new types of toxic agents to defeat NATO gas masks and protective clothing.⁸

While the U.S. unilaterally abandoned chemical weapons production in 1969, the Soviets' production continued unabated. In 1987, the Soviets admitted for the first time the possession of chemical weapons, and acknowledged an aggregation of 50,000 agent tons.⁹ However, it is believed this figure is grossly understated. Some estimates indicate the Soviet offensive stockpile is closer to 80-100,000 tons.

The Soviets possess the largest chemical warfare force in the world. Over 60,000 dedicated chemical personnel and over 30,000 special vehicles for CBW operations comprise the Soviet force.¹⁰ In addition, the Soviet offensive and defensive training is unsurpassed. Live chemical agents are used during training exercises. Further, the Soviets maintain 19 chemical training battalions which normally conduct 100-400 formal training hours per year at 78 field training areas.¹¹ As a direct result, the Soviet Union's chemical warfare preparedness far exceeds that of any nation in the world and is seen as an immense threat to NATO and its allies.

THE WARSAW PACT

There is little open literature on the chemical warfare capabilities of the Warsaw Pact. It is estimated their defensive training and preparedness mirror that of the Soviet Union. All offensive chemical weapon stocks, to be used by the Warsaw Pact countries, are held and controlled by the Soviet Union. Also, it is generally accepted that the Warsaw Pact is better prepared for chemical warfare than NATO.¹² Further, all Warsaw Pact countries have signed the 1925 Geneva Protocol, some with and some without reservations.

THE NATO ALLIANCE

Of the Western nations, besides the United States, only France and Belgium possess a chemical weapons capability. Belgium is reported to possess approximately 100 artillery rounds filled with Sarin (nerve agent). France, on the other hand, holds an unknown quantity, which is believed to be significant, of unspecified nerve agent munitions.¹³ Although joint chemical training exercises have increased the overall level of chemical defensive preparedness, the inadequate defense budgets of many of our alliance countries have prevented them from accomplishing the required field training exercises. This lack of training represents a significant deficiency in NATO's overall chemical defense preparedness. In addition to the less than optimum chemical

defense capability, NATO has left the burden of a chemical retaliation to the U.S. and France.

OTHER NATIONS

Chemical weapons have become a global problem. Although the factors mentioned above allow the spread of chemical weapons, the actual determination of what countries possess or have the capability to produce chemical weapons is extremely difficult to detect. Moreover, the frequency of alleged and actual use of chemical weapons in Third World conflicts or civil disorders is clearly on the rise (see figure 2). This proliferation of chemical weapons in Third World countries substantially increases the lethality of low-intensity conflicts, and threatens our allies and U.S. forces abroad. In his Annual Report to the Congress for Fiscal Year 1990, the Secretary of Defense, Frank C. Carlucci, indicated that a Third World conflict may be the most likely scenario for a chemical or biological attack on U.S. forces.

THE CONFIRMED OR ALLEGED USE OF CHEMICAL WEAPONS:
A CHRONOLOGY SINCE WORLD WAR I⁴

- 1935-1936: Italy against Ethiopia.
- 1939-1944: Japan against the Chinese.
- 1963-1967: Egypt's alleged use in Yemen.
- Late 1970s: Vietnam's reported use in Laos and Cambodia (Kampuchea).
- 1980-1983: Ethiopia's reported use against Eritrean rebels.
- 1983-1988 (Iran/Iraq War): Both countries use of poisonous gases against each other. Iraq used poison gas against its own Kurdish population in March 1988.
- 1987: Libya's reported use against Chad.
- 1989: Soviet's reported use in Tbilisi in Soviet Georgia.

Figure 2

ENDNOTES

1. Chemical Warfare Review Commission, p. 11.
2. U.S. Arms Control and Disarmament Agency, Office of Public Affairs, "Issues Brief: Chemical Weapons (CW) Proliferation," 20 September 1989, p. 1.
3. Association of the United States Army, Chemical Warfare - A Real and Growing Threat, p. 9.
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7. Chemical Warfare Review Commission, pp. 26-27.
8. Ibid., p. 27.
9. U.S. Department of Defense, Soviet Military Power: Prospects for Change 1989, p. 67.
10. Ibid., p. 68.
11. Association of the United States Army, Chemical Warfare: A Real and Growing Threat, p. 8.
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14. Association of the United States Army, op. cit., p. 9. and Frank Gaffney Jr., "Bush Ignored Chemical Weapon Experts," Defense News, 23 October 1989, p. 23.

CHAPTER III
U.S. CHEMICAL WEAPONS CAPABILITIES

BACKGROUND

The U.S. has supported its "no-first-use" chemical weapon policy through the development of a large chemical weapons stockpile. As a signatory to the 1925 Geneva Protocol, the U.S. has never had to use lethal chemical weapons during war. By the end of the 1960s, it was estimated the U.S. had accumulated over 80,00 agent-tons¹ of toxic chemical munitions and bulk agents. More recent estimates indicate this figure is now closer to 30,000 agent-tons.² The majority of the inventory consisted of artillery shells and a few bombs, produced in the 1950s and 1960s, along with one-ton drums of bulk chemical agents, dating back as early as 1940.³

At the height of the chemical weapons program (1960s), the Army, the executive service for our national chemical program, established two nerve agent production facilities, a research establishment, an elaborate network of supporting facilities for the storage of chemical weapons and applicable defense equipment, a substantial quantity of chemical ordnance specialists, and the necessary training center.⁴ However, beginning in 1967, for a number of reasons, primarily the negative effects of the Vietnam conflict and the increased public awareness of environmental

issues, the U.S. chemical program started a sharp decline. In less than ten years, the situation deteriorated to a point that in 1975, a commission reviewing the U.S. chemical warfare readiness, concluded "the deficiencies in the U.S. chemical program made force survivability in chemical war questionable." By 1975 the number of chemical specialists on active duty declined to less than 2000, and the capability to conduct chemical reconnaissance and/or decontamination by active operational units was nonexistent.⁵ Further, chemical defense equipment was in short supply and outdated. Finally, the U.S. Army Chemical School, which was responsible for specialists' training and the development of chemical weapon doctrine for all the services, was inactivated in 1972.

As a direct result of the chemical warfare readiness review and the increased awareness of the chemical threat following the 1973 Middle East War, in 1975 Congress appropriated \$1.5 billion⁶ to correct noted deficiencies in chemical protection and training. By 1980, chemical specialist strength rose to 4,000⁷, and the Army Chemical School was reestablished at Fort McCellan, Alabama. In 1983, Theodore S. Gold, the Deputy Assistant to the Secretary of Defense for Chemical Matters, affirmed to the U.S. Congress

Although we are not yet where we need to be with regard to chemical protection, considerable progress has been made. Of most significance is the increased chemical related training in all services: Army, Air Force, Marines and Navy. Instructional time devoted to chemical defenses has increased, the number of trained specialists has increased, the

amount of time spent by operational units in protective gear has increased, and the frequency and extent of chemical operations in major field exercises has increased. Individual protective equipment is available to Army, Air Force and Marine units. The Navy is in the progress of equipping its personnel. . . . Improved detection equipment has been fielded and a very promising collective protection system was installed and is undergoing test at Ramstein Air Base, Germany.³

CURRENT U.S. CAPABILITIES

Although the number of dedicated chemical specialists more than doubled in the past ten years, only a small percentage of the current stockpile has a deterrent value. Today, the U.S. chemical stockpile is estimated to contain less than 30,000 agent-tons. Approximately 2,000 agent-tons of nerve agent in filled projectiles and 1,500 agent-tons of nonpersistent nerve agent bombs are considered useful.⁹ The remainder of the stockpile consists of unserviceable or obsolete munitions and bulk agents not filled in munitions.

In 1985, as reported by the Chemical Warfare Review Commission, the U.S. chemical weapons inventory consisted of:

1. 155 mm howitzer projectiles. These projectiles are usable today; however, because of their 1950s shell-casing design, the 155 mm projectile cannot be safely fired beyond 17 kilometers, which is 5 to 7 kilometers less than the range of modern conventional artillery projectiles. Further, current U.S. infantry tactics call for only nonpersistent agents to be used

within artillery range of the front lines. However, a large portion of existing stocks are filled with persistent mustard agent. These projectiles are also less effective because the mustard agent solidifies at temperatures below 58 degrees Fahrenheit. Of the remaining projectiles containing nerve agents, the vast majority contain persistent VX nerve agent.

2. Eight-inch howitzer projectiles. These projectiles have the same restrictions and use as the 155 mm howitzer projectile. The majority of the inventory is filled with nonpersistent nerve agent GB, with the rest VX.

3. 105 mm howitzer projectiles. These projectiles are in large quantity and are still usable today. One-third of existing stocks is filled with mustard agent and the rest with nonpersistent GB that is suitable for short-range retaliation up to 11 kilometers. (Note only 606 105 mm howitzers remain in the U.S. active Army inventory today with none currently deployed in Europe).

4. 4.2 inch mortar projectiles. These projectiles are not operationally useful. All rounds are filled with persistent mustard agent and have a maximum range of only 4.5 kilometers.

5. M-23 land mines. Produced in the 1950s to counter human wave infantry attacks, these mines are not considered compatible with modern battlefield tactics. All mines are filled with persistent VX agent.

6. M-55 115 mm battlefield rockets. These rockets are filled with nerve agents (GB or VX) and are obsolete since a

suitable launcher is not available. In addition, the rockets have developed a serious leakage problem and have been declared hazardous waste by the Army.

7. MC-1 750-pound Air Force bomb. These bombs are filled with GB nerve agent and are certified on most U.S. tactical aircraft. Quantity is limited.

8. MK-94 500-pound Navy bomb. These bombs are still useful, however, quantities are limited. All bombs are filled with GB.

9. MK-116 (Weteye) 600-pound Navy bomb. This bomb releases an aerosol spray of nerve agent (GB) upon detonation. It is only available in limited quantities.

10. M-43 BZ 750-pound cluster bomb and M-44 175-pound air-dropped BZ cluster generator. BZ is an incapacitating psychochemical agent that causes disorientation and temporarily degrades mental activities. These weapons are essentially useless because they are extremely hazardous. BZ weapons are filled with a solid pyrotechnic mixture which becomes unstable over time. Assets have been in the inventory for over twenty years.

11. TMU-28 airborne spray tank. This device is currently certified for use on the F-4, which is being phased out of the U.S. inventory. Action is underway to certify the TMU-28 on the F-16 aircraft. This weapon is the only aircraft-delivered item in the U.S. inventory containing a persistent (VX) nerve agent. However, operational delivery tactics require the aircraft to fly low, and straight and level for effective agent dispersion.

These tactics would be suicidal against modern anti-aircraft defenses.

12. 155 mm gun rounds. This ammunition is essentially useless since neither the U.S. nor any NATO country currently possesses the 155 mm gun.

13. Bulk chemical agents. Approximately 61 percent of the total chemical inventory consists of bulk agents stored in liquid form in one-ton steel cylinders. These bulk agents are still usable today, and consists of nerve, mustard and incapacitant (BZ) agents. All bomb refill facilities were closed in the late 1960s. The Army estimates that it would take at least two years before refill facilities could become operational again.¹⁰

Figure 3 summaries U.S. retaliatory capabilities.

U.S CHEMICAL RETALIATION CAPABILITIES¹¹

INVENTORY	AMOUNT OF TOTAL INVENTORY	CONDITION	DEFICIENCIES
Persistent and Nonpersistent Nerve Agent Artillery		Useful	Limited to artillery range Wrong Agent to weapon range Aging stockpile
Nonpersistent Nerve Agent Bomb	10%	Limited Use	Wrong agent to weapon mix Aging stockpile
Persistent and Nonpersistent Agent Small Artillery and Mortars		Limited Use	Short range High risk to friendly forces Does not support modern tactics
Airborne Spray Tanks	18%	Limited Use	High risk delivery method Does not support modern tactics
Bulk Nerve/Mustard Containers		Of No Use	No fill facilities
Other Configurations	72%	Obsolete	No delivery system

Figure 3

The U.S. Fiscal Year (FY) 1989 Military Posture statement, developed by the Joint Chiefs of Staff to supplement testimony given by the Chairman and other members of the Joint Chiefs of Staff at congressional hearings, indicated that the U.S. has made significant progress in its joint contamination avoidance, protection, and decontamination programs. Figure 4 outlines current U.S. chemical defense posture and planned improvements. Chemical biological defense procurement programs are depicted in figure 5.

US CHEMICAL WARFARE PROTECTION CAPABILITIES^{1,2}

Category	Currently Used	Planned Improvements
Individual protection	Protective mask Protective overgarments*	Improved mask Less restrictive overgarments
Collective Protection	Limited shelters	Transportable shelters Fixed site shelters Shipboard upgrades Portable modular systems
Detection and warning	Detection paper Chemical agent alarm Chemical agent detector kit	Hand-held monitor Unattended remote sensor Point scanner NBC recon vehicle
Decontamination	Individual decontamination Decontamination apparatus Chemical agent-resistant coatings Lightweight decontamination system	Non-water-based decontamination

* Includes gloves and boots

Figure 4

**CHEMICAL/BIOLOGICAL DEFENSE
PROCUREMENT PROGRAMS--**

<u>Protection</u>	<u>Service</u>	<u>Year</u>
Simplified collective protection equipment sets (1,300)	A	90-91
Collective protection for heavy force modernization	A	mid-90s
Chemical agent monitor	A/N/AF	90-91
Nuclear-biological-chemical reconnaissance system (to detect, identify and report contamination on the battlefield)	A	14 vehicles: FY90 28 vehicles: FY91
Pretreatment drugs for improved protection, an improved antidote for nerve agents, and an enhanced medical treatment capability	A/N/AF	early to mid-90s
Standoff chemical agent detection system (AN/KAS-1 chemical warfare directional detector)	N	currently fielded
Chemical agent point detection system for installation aboard surface ships	N	100 each year
Survivable collective protection system (for shore installations)	N/AF	97 installed at AF installations-- continued procurement for next five years
MCU-2/P protective masks	N/AF	unk
New ground crew masks	AF	75K fielded/100K more by 1990
Improved air crew masks (F-16 & C-130 aircraft)	AF	begin 90/40K by 2000
Second-generation ground crew overgarment	AF	being fielded
Second-generation air crew overgarment	AF	91
Work center collective protection system	AF	60 installed--another 60 by 2005

A = Army N = Navy AF = Air Force

Figure 5

The planned procurement of readiness related equipment (masks, chemical agent alarms, vaccines and antidotes) shown above will substantially improve the combat readiness and sustainability of our combat forces in a contaminated environment. The only unresolved problem is the lack of a credible chemical weapon retaliatory capability.

PROPOSED U.S. CHEMICAL WEAPONS MODERNIZATION PROGRAM

Proposals to modernize the U.S. chemical stockpile have been presented to the Congress for several years. Modernization plans for the chemical stockpile center on the binary 155 mm howitzer (GB) round, the BLU-80/B Bigeye (595-pound binary VX) bomb, and the Multiple-Launch Rocket System (MLRS) binary chemical warhead. The MLRS contains an intermediate volatility agent (less persistent than VX but more so than GB). These new binary munitions consists of two non-lethal reactants, that produce nerve agent (VX or GB) only after an artillery projectile is fired or when a bomb is released from an aircraft. DoD representatives have repeatedly insisted that the binary program will not only correct existing stockpile deficiencies and operational limitations, but will provide a safe and credible chemical weapon deterrent.

The modernization plan has become a political issue. Congress appears to have reached a moral dilemma. Congressmen seem uncomfortable with chemical weapons from a moral standpoint, but they recognize the deficiencies of the existing stockpile and the

need to maintain a degree of insurance against the possible use by others. Although the dilemma is not over, Congress appropriated funds in FY 1986 for a limited production of 155 mm binary howitzer rounds. Binary 155 mm rounds began entering the U.S. inventory in 1987. Further, if Congress provides appropriate funding, production of the Bigeye bomb and the MLRS could begin in 1991⁻⁴ and 1994⁻⁵, respectively. However, many argue that the likelihood of Congress funding these programs is remote.

The Air Force, feeling the FY 1991 budget crunch, zeroed out and cancelled its Bigeye requirement. Unless the Air Force Service Chief can be persuaded to reinstate and defend USAF Bigeye requirements, congressional support would certainly weaken. Further, in light of the anticipated date that the multilateral CW agreement would be ready for signature (1992)⁻⁶, the MRLS would be prohibited from production by the provisions of the multilateral Convention. Finally, once President Bush and Mikhail Gorbachev sign the bilateral CW agreement, committing each country to destroying 80 percent of its current stocks, President Bush would undoubtedly come under intense pressure to halt production of binary weapons. Although, the bilateral agreement would allow production of chemical weapons, continued production could certainly be viewed as an act of bad faith on the part of the U.S.

ENDNOTES

1. Stringer, p. 28.
2. Interview with Frank J. Cox, Colonel, Chief, Chemical Warfare Branch, Nuclear and Chemical Division, Strategic Plans and Policy Directorate, J-5, The Joint Staff, Washington, 4 March 1990.
3. Chemical Warfare Review Commission, p. 19.
4. Stringer, p. 28.
5. Ibid., pp. 29-30.
6. J. P. Perry Robinson, "Chemical Warfare Capabilities of the Warsaw Pact and North Atlantic Treaty Organizations: An Overview from Open Sources," Chemical Weapons: Destruction and Conversion, p. 21.
7. United States Army Chemical School, "Chemical Force Structure," graphic number 6392-314-5784.
8. Theodore S. Gold, Deputy Assistant to the Secretary of Defense (Chemical Matters), Statement in U.S. Congress, House, Department of Defense Appropriations for 1984, op. cit., Part 5, p. 452.
9. Stringer, p. 28.
10. Chemical Warfare Review Commission, pp. 21-24.
11. Joint Chiefs of Staff, United States Military Posture FY 1989, p. 73.
12. Ibid., p. 72.
13. Chemical Warfare Review Commission, pp. 21-24.
14. Welch, p. 21.
15. Interview with Frank J. Cox, 5 March 1990.
16. Ibid.

CHAPTER IV

U.S. VULNERABILITIES AND PRACTICAL RESPONSES TO CW

Keeping in mind the chemical warfare threats examined in Chapter II and the current U.S. chemical weapon retaliatory capabilities detailed in the last chapter, this study will now focus on U.S. vulnerabilities to global chemical weapon threats. In addition, practical U.S. responses to chemical warfare will be examined. Three separate time periods will be analyzed: before a bilateral agreement between the U.S. and the Soviet Union, after a bilateral agreement, and after a multilateral agreement. Prior to enumerating vulnerabilities, the following assessments of the probable course of CW negotiations are formulated:

FUTURE COURSE OF NEGOTIATIONS

Barring no significant change in world events, a chemical weapon bilateral agreement between the U.S. and the Soviet Union is due to be signed at the June 1990 summit meeting. The agreement should contain the following provisions: the verifiable reduction of existing declared chemical weapon stocks to a common low level--approximately 6,000 agent-tons; the prohibition of the transfer of chemical weapon stocks to other nations; and the open exchange of chemical weapons technology between the U.S. and the Soviet Union.

The earliest date that a multilateral treaty could be ready for signature is believed to be in 1992¹. This date is predicated on solving many significant issues currently confronting the 40-nation Conference on Disarmament (CD), which is responsible for drafting the Chemical Weapon Convention.

One of the most serious issues is how to ensure that all States that possess or have the capability to produce chemical weapons are among those States whose ratification would be required for the Convention to enter into force. Significant foot dragging can be anticipated by Ethiopia, China, Cuba, and Iran--all nations which, with the exception of Cuba, have been attacked by chemical weapons. In addition, Libya, Vietnam, and Iraq have previously used chemical weapons against their adversaries. Also, developing nations such as, India, Indonesia, and Pakistan want assurances that restrictions on technology and chemicals will not stunt the growth of their young chemical industries.²

Another significant hurdle to the signing of a multilateral agreement is the apparent linkage between chemical and nuclear weapons. At the international conference on chemical weaponry in Paris in 1989, the Arab delegates, citing Israel's nuclear arsenal, stated "asking certain countries to sign a treaty banning only chemical weapons, and not nuclear weapons, is in effect asking them to unilaterally disarm in the face of their traditional regional enemies."³

Finally, the development of effective verification measures that ensure the detection and destruction of global chemical

weapon stocks will be a discouraging challenge. However, assuming these problems can be resolved, the U.S. and the Soviet Union will destroy more than 80 percent of its current stockpile by the year 2000.

Assuming all chemical weapon capable states adhere to the multilateral convention, the U.S. and the Soviet Union would eliminate all its chemical weapon stocks by the year 2002. However, unless teeth--economic sanctions--are added to the multilateral treaty to discourage possession of chemical weapons, it is extremely doubtful all countries possessing chemical weapons would either join the treaty or destroy their assets. To date, there has been very little talk of including economic sanctions in the treaty. In today's political environment, the likelihood of including such sanctions in the multilateral treaty is extremely remote. Further, since the possession of chemical weapons is almost impossible to detect, it must be assumed that there will always be countries who will attempt to hide their possession of chemical weapons. In addition, it must also be assumed that some countries will attempt to hide their capability to quickly produce banned assets. This reality of possible continued presence of chemical weapons, even under a treaty, must be acknowledged when developing future military strategy.

U.S. VULNERABILITIES

PRIOR TO U.S.-SOVIET UNION BILATERAL AGREEMENT

The principal chemical weapon threat confronting the U.S. prior to the bilateral agreement is that of the Soviet Union. The Soviets have a significant stockpile advantage over the U.S. (more than a 10 to 1 ratio). Unlike the U.S., which lacks a deep-strike persistent agent system and a capability for engaging targets with persistent or nonpersistent agents beyond artillery range², the Soviets can cover all areas of the battlefield with their various delivery systems. Further, Soviet protection capabilities, dedicated personnel and large mobile devices for decontamination and reconnaissance exceed the U.S. capabilities by 10 to 1 and 30 to 1 ratios, respectively.

However, for the Soviets to decide to use chemical weapons, many argue that the Soviets must first believe it to be to their advantage to do so, i.e., they expect a favorable outcome. Second, they must be convinced that the current U.S. chemical weapon stockpile is of little value and is no threat to Soviet combat forces. Finally, the Soviets must be persuaded that NATO would not escalate to a nuclear attack, due perhaps to lack of resolve.

If the Soviets do not fear some kind of retaliation, either chemical or nuclear, then it would be to their advantage to employ chemical weapons. In a CW environment where targeted units are forced to don protective clothing and undergo decon-

tamination, combat capabilities are significantly degraded. Although protective clothing will reduce CW casualties, it is cumbersome and degrades mobility, dexterity, vision and ability to communicate. In addition, protective gear adds substantial physical and psychological burdens. U.S. Air Force and Army exercises conducted in protective clothing have clearly demonstrated significant reductions in aircraft sortie generation and less effective rifle fire.⁵ Therefore, it is a big advantage to the aggressor (Soviets) to put his enemy (U.S.) in a defensive CW environment.

Although the U.S. has less than 3,500 agent-tons of chemical weapons that are considered operationally effective, it should be sufficient enough to force the Soviets to don their protective clothing. The consequences of both sides operating in a CW environment now takes away the Soviet advantage. The Stockholm International Peace Research Institute made the following observation concerning CW use: "It is clear that in those rare cases since World War I when chemical weapons have been used on a substantial scale, it has always been against an enemy known to be deficient in antigas protective equipment or retaliatory capability."⁶ For reasons such as these, many conclude that the Soviets will certainly think twice before using chemical weapons.

A more effective and perhaps more credible deterrent against a Soviet CW attack is the use of nuclear weapons. A tactical nuclear response in retaliation to a chemical attack is certainly within the realm of the U.S. flexible response doctrine. Many

argue that the use of tactical nuclear weapons is politically unacceptable by our allies, especially those on whose territory nuclear weapons will be used. However, the U.S. military strategy clearly states that the U.S. will do whatever is necessary, to include the use of nuclear weapons, to deny the Soviets attainment of their goals. Therefore, it would be unrealistic to expect that the Soviets would not believe that the U.S. would escalate to nuclear weapons if NATO were losing the battle in a CW environment.

Further, in light of today's realities--the collapse of communism, a demoralized Soviet military, and the attempt of Eastern Block countries to withdraw from the Warsaw Pact--the Soviets would most likely only use chemical weapons in a retaliatory response to an NATO first use. This reflects the new Soviet political thinking that considers war as an unacceptable means of reaching political ends.⁷ Soviet political and military authorities have both indicated that their military doctrine has been revised and is now aimed at precluding war rather than preparing for it.³ They contend that the Soviet military development is now strictly tailored to the level of threat and determined by the requirements for a reliable defense. Further, political and military aspects of the new Soviet doctrine indicate that under no circumstances will the Soviet Union be first to launch hostilities against any state unless it itself becomes invaded.⁹ Mikhail Gorbachev's significant arms control initiatives and concessions to Warsaw Pact countries, makes one believe

that the new Soviet military doctrine is not just political rhetoric. Soviet defensive intentions appear real and are apparently here to stay. However, the U.S. must be cautious in disbanding forces or destroying military assets until reductions in Soviet offensive capabilities are actually verified.

In summary, although the Soviets offensive and defensive chemical weapon capabilities far exceed that of the U.S., the current political realities and the deterrence affect of existing U.S. chemical and nuclear weapon arsenals suggest that it is highly improbable the Soviets would initiate a chemical attack except in retaliation.

Another potential threat confronting the U.S. prior to a bilateral agreement is that of Third World countries. Although over 20 Third World countries now possess or have the capability to produce chemical weapons, the U.S. has sufficient retaliatory stocks to include chemical weapons to deter any Third World use. However, should deterrence fail, possibly because our adversaries believe the U.S. lacks resolve to enter into regional conflicts or believe they can gain an advantage over the U.S. or our allies by initiating chemical warfare, we must be capable of surviving a chemical attack and retaliating in such a manner as to stop aggression immediately. Since chemical weapons are extremely cheap to produce and act as a force multiplier, it must be assumed that low to mid-intensity conflicts involving Third World countries will most likely involve chemical warfare. Therefore, the U.S. must be adequately prepared to deploy its forces in a

chemical environment and be properly equipped to defeat the opposing force swiftly.

PRACTICAL RESPONSES TO CHEMICAL WEAPONS USE

Chemical weapons would probably not be used by the U.S. in low to mid-intensity conflicts (LIC-MIC). This assumption is based on current political realities and the means by which tactical strategies of force employment are developed.

The political climate today, although it allows the development of a military retaliation-in-kind, actually implies the prohibition of chemical weapon use. President Bush, by taking the lead to bring into force a global ban on the development, production and use of chemical weapons, has established a U.S. policy that suggests a no use, even in retaliation. In essence, any chemical weapon use by the U.S. before or after a multilateral agreement would certainly be seen by other nations as a contradiction to U.S. stated political objectives, i.e., the global ban and use of chemical weapons. This contradiction would be politically devastating to U.S. credibility as a world leader.

Second, in LIC/MIC environments, combat operational realities often negate U.S. chemical weapons use. This assumption is reflected in the development of tactical strategy in response to enemy first use of chemical weapons. As combat forces engage, three important questions must be answered. The first is, are we

winning the war? If so, then a chemical retaliatory response is not necessary. If not, then the second question must be answered, are we losing because of chemical attacks? If not, then again there is no need for a chemical response. However, if we are losing because of chemical attacks, then unique measures must be considered. Possible choices would be: retaliation-in-kind; the employment of Special Forces, if not already done so; an increase in conventional ground, air and naval forces; and, the initiation of aerial conventional bombardment on key government facilities, transportation choke points, and economic centers. The unwanted collateral effects on noncombatants, possible threat to friendly unprotected forces, and negative political reaction constrain if not eliminate the use of chemical weapons as an effective response to chemical weapons first use. Therefore, the only real response to a chemical attack in a LIC/MIC environment is with conventional weapons.

Finally, only in a total war (high intensity conflict) is it envisioned that the U.S. would use chemical weapons. When the national survival of the U.S. or NATO is at stake, the public as well as the political leadership of the U.S. would certainly be more attuned to ensuring that the U.S. is not defeated than to the negative aspects of using chemical weapons. Unfortunately this holds true for all countries contemplating the use of chemical weapons. If the use of chemical weapons ensures a favorable outcome of the war, then its use becomes more likely a reality.

U.S. VULNERABILITIES
AFTER A BILATERAL AGREEMENT

A bilateral agreement, provided the Soviets can destroy their chemical weapons and are not withholding identification of additional CW stocks, might reduce U.S. and USSR stockpiles to around 6,000 agent-tons, given current estimates. At this time, parity in U.S. and Soviet chemical weapon tonnage would be reached. Under this condition, the existing U.S. inventory would become a more effective deterrent against Soviet CW first use. In turn, the U.S. would rely less on its nuclear stockpile as a CW deterrent. This would in effect raise the nuclear threshold. Moreover, key to the effectiveness of the bilateral agreement, is the establishment of a comprehensive inspection regime. Without a means to verify the destruction of chemical weapons or to detect chemical weapon stockpiles, the U.S. will remain extremely vulnerable to violators of the treaty.

Although parity would be reached in chemical weapon stocks after a bilateral agreement, the U.S. would still remain vulnerable because chemical weapons are not stored at places of intended use. The vast majority of U.S. CW stocks are stored in the United States. In fact, the U.S. and West Germany recently completed an agreement to remove all chemical weapons stored in Germany by the end of 1990. Therefore, if the stocks removed from Germany had to be recalled to Europe, the U.S. would be at a significant retaliatory disadvantage as compared to the Soviets.

Further, many argue that because of significant logistics problems associated with the release and shipment of chemical weapons, a response to Europe would not be timely. This inability to retaliate quickly limits the deterrent value of U.S. chemical weapon inventory. However, once assets are moved and prepositioned at places of intended use, these assets would be suitable for operational use. The mandated 80 percent reduction in current chemical weapon stocks imposed by the bilateral agreement only eliminates obsolete and unserviceable assets. The U.S. chemical weapon retaliatory capability is therefore not affected. The remaining inventory would most likely consist of binary and unitary 155 mm howitzer rounds, TMU-28 spray tanks, MC-1 bombs, and the Navy's MK 94 and MK 116 GB bombs. These assets should be sufficient to deter Soviet chemical weapon first use.

The chemical weapon threat imposed by other countries before or after a bilateral agreement remains unchanged. The U.S. still retains sufficient retaliatory stocks to include chemical weapons (6,000 agent-tons) to deter chemical weapon first use by any Third World country. However, for the same reasons mentioned above, the U.S. would probably not retaliate-in-kind with chemical weapons.

U.S. VULNERABILITIES
AFTER A MULTILATERAL AGREEMENT

After a multilateral agreement, both the U.S. and the Soviet Union might eliminate up to 98 percent of its chemical weapon stockpile. Provided the Soviets have not cheated and possess more assets than originally declared, U.S and Soviet chemical weapon stocks would again reach parity. Although less than 600 agent-tons will be available, these assets should still be sufficient to deter Soviet first use.

Further, provided chemical weapons capable states adhere to the multilateral agreement, all remaining U.S. and Soviet stocks would be eliminated within two years. However, adherence to the treaty by all signatories is highly unlikely. Nonetheless, the political momentum today if it remains unchanged, would probably result in the U.S. destroying its residual stockpile, provided the Soviets do the same. After destruction of all known stocks, the U.S. deterrence against any forbidden hoarding or use will rely solely on its combat-ready conventional and nuclear forces. However, if procurement of chemical defense equipment (detection, decontamination, and individual and collective protection) continues as currently programmed, significant improvements in U.S. chemical defense capability should be fielded by the year 2000. These new assets will make U.S. combat forces more survivable and at the same time, highly effective and less vulnerable in a chemical environment.

ENDNOTES

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5. Welch, p. 21.
6. Stockholm International Peace Research Institute, The Problem of Chemical and Biological Warfare: Vol I. The Rise of CB Weapons, 1971, p. 19.
7. Vladimir Nararenko, "Soviet and U.S. Military Doctrine and Progress in Arms Control," 1988 Colloquium Reader: Technology, Security, and Arms Control for the 1990s, p. 143.
8. Ibid., p. 143.
9. Ibid., p. 144.

CHAPTER V

RECOMMENDATIONS

The preceding chapters examined chemical weapon threats and identified U.S. vulnerabilities. This examination showed that the U.S. chemical stockpile, although insufficient in quantity as compared to Soviet inventories, did have some deterrence value. Further, it showed that until the United States and the Soviet Union reach chemical parity, the U.S. must rely on not only its chemical retaliatory stock but also its nuclear arsenal and a strong conventional force to deter a chemical weapon attack. Once parity is reached, the existing U.S. chemical inventory becomes a more effective deterrent against Soviet CW first use. This in effect allows the U.S. to rely less on its nuclear stockpile and thus raise the nuclear threshold.

Finally, it is clear that the chemical weapon threat imposed by Third World countries will not diminish. In fact, the reality of possible continued presence of chemical weapons, even after a treaty, must be taken into consideration when developing future military tactics.

These conclusions are dependent on the U.S. capability to detect chemical weapon stockpiles or production capabilities, to effectively verify the destruction of chemical weapons, and to maintain a highly trained and well equipped combat force. However, limitations exists in these areas which prevent the attain-

ment of chemical deterrence and proper support of U.S. national security objectives. Only through the development and attainment of new U.S. national security objectives can these limitations be eliminated. Once appropriate security objectives are identified, then applicable military goals and objectives can be implemented.

U.S. NATIONAL SECURITY OBJECTIVES

The current national security objective contains few statements concerning chemical warfare. To ensure that our fundamental national security goal of preserving the U.S. as a free nation is not degraded due to accelerated agreements to the prohibition and destruction of chemical weapons, I recommend our basic national security objective include the following statements after a chemical treaty:

- o To encourage and assist all nations in destroying chemical weapon stocks and in developing chemical weapon defensive systems.
- o To reduce U.S. reliance on chemical retaliation through the active research and development of chemical warfare defense systems, and by emphasizing realistic chemical warfare training.
- o To encourage and assist all nations in developing national technical means and on-site inspection capabilities to detect chemical warfare violations and/or the destruction of chemical weapon stocks.

MILITARY GOALS AND OBJECTIVES

TRAINING

In his 1990 annual report to the President and Congress, the Secretary of Defense, Dick Cheney, indicated that in the near future, low-intensity conflicts involving Third World countries, will most likely be the form of violence threatening U.S. interest.¹ With the continued proliferation of chemical weapons and the difficulties in detecting CW stockpiles, U.S. forces must be prepared for chemical warfare. A highly trained and well-equipped combat force is absolutely essential in countering a chemical weapons attack, as is defeating such an attack quickly and decisively. Our goal, to deter chemical warfare, is predicated on the possession of a credible chemical defense which reduces the utility of an enemies chemical weapons, and highly trained retaliatory forces. Chemical deterrence is achieved by making it perfectly clear to any aggressor that the U.S. will do what ever is necessary to ensure the costs of aggression would far outweigh any possible gains they might hope to achieve.²

New defensive equipment and tactics have improved our sustainability and combat effectiveness in a chemical environment. However, in light of temptations to cut defensive chemical training and chemical specialists during lean budget years, all Services must continue to emphasize defensive chemical training. If the U.S. allows its chemical warfare defense program to decline,

as it did after the Vietnam conflict, then its capability to project a chemical deterrence and a winning combat force in a chemical environment will again be suspect.

Moreover, to gain insight as to how the Soviets train their combat forces in a chemical weapon environment, the U.S. should encourage the development of a chemical weapon specialists exchange program with the Soviets. This exchange and associated visits to chemical weapon training centers would significantly enhance confidence building of each nation.

INTELLIGENCE

The ability of U.S. intelligence to determine the possession of chemical weapon stocks or the capability to produce chemical weapons is questionable. The Chemical Warfare Review Commission indicated to the President in 1985 that "U.S. intelligence agencies for years virtually ignored the chemical and biological threat."³ Although some argue that improvements have been made, significant gaps still exist. The U.S. intelligence continually overly emphasizes the use of national technical means (overhead photographic and electronic data gathering) and has neglected human intelligence (HUMINT) sources.⁴ The magnitude of the possible chemical proliferation throughout the Third World, and the 44,000-plus agent-tons the Soviets must destroy will significantly increase chemical weapon detection and destruction verification problems. It cannot be overly emphasized that the main

problem of effective verification is lack of signature of secret stocks or production capabilities.

To meet the projected chemical weapon detection and destruction verification demands, U.S. intelligence gathering and analysis must be greatly improved. Additional funding must be provided for increased HUMINT, national technical means, and on-site verification inspections of declared and non-declared facilities. Without an effective intelligence program, the U.S. is left totally vulnerable to those unscrupulous parties who would use the arms control process to gain an advantage over their national enemies.

RESEARCH AND DEVELOPMENT

The cornerstone to chemical deterrence is a highly trained and equipped combat force. The projected chemical and biological procurement programs identified in Chapter III will significantly increase U.S. combat capabilities in a contaminated environment. However, even with these noted improvements, many shortcomings still exist. The protective mask still has its limitations, and the overgarment is still unsuited for warmer climates. These limitations reduce individual operational effectiveness in a contaminated environment by 30 to 50 percent.⁵ It is therefore essential that research and development in the technology of chemical defense continue as to reduce battlefield risks. Further, it can be assumed that once bilateral or multilateral

agreements are signed, Services will be tempted to zero out chemical defense programs for the modernization of conventional forces. Since there is no way that there can be absolute assurance that even under a treaty, CW will never be used against U.S. forces, each Service must be encouraged to not only continue funding existing programs, but also to support joint research and development efforts to counter new threats. Further, with the battlefield becoming more and more lethal, the U.S. must focus its attention on the development of unmanned robotic systems. In a chemical environment unmanned systems would be ideal for reconnaissance, chemical decontamination, and the application of smoke. Robotic technology is available today and is seen in many commercial industries. The U.S. must take advantage of this technology and begin to develop systems that will ensure U.S. survivability in future wars.

Finally, it appears little thought has been given to the costs associated with the President's chemical weapon bilateral and multilateral agreements. The destruction of chemical weapons is extremely expensive. It is estimated it will cost \$2.4 billion to destroy our total stockpile.⁶ In addition, verification costs will soar and defensive costs will remain unchanged. However, the additional costs of chemical weapon training, enhanced intelligence gathering, and continued research and development for improved chemical defense, is nothing compared to the possible loss of lives of our combat forces because they were

ill equipped and inadequately trained to fight and win in a chemical environment.

An attack against the U.S. with chemical weapons is unacceptable and an effective response would be expected. However, the possible embarrassment of defeat as a result of a chemical attack would certainly raise serious doubt about the effectiveness of our national security establishment and result in demands for swift and effective retribution against not only the perpetrators of the chemical attack but also the bureaucracy that allowed the vulnerability to develop.⁷ We can not allow this to happen. We must ensure that the forces we instill to protect our national security, goals and objectives, are highly trained and well equipped to counter any threat, to include CW, in future battlefields.

ENDNOTES

1. U.S. Department of Defense, January 1990: Annual Report to the President and the Congress, p. 3.

2. Ibid, p. 2.

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5. Welch, p. 21.

6. Ibid, p. 26.

7. Stringer, p. 41.

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